Small Business Innovation Research/Small Business Tech Transfer

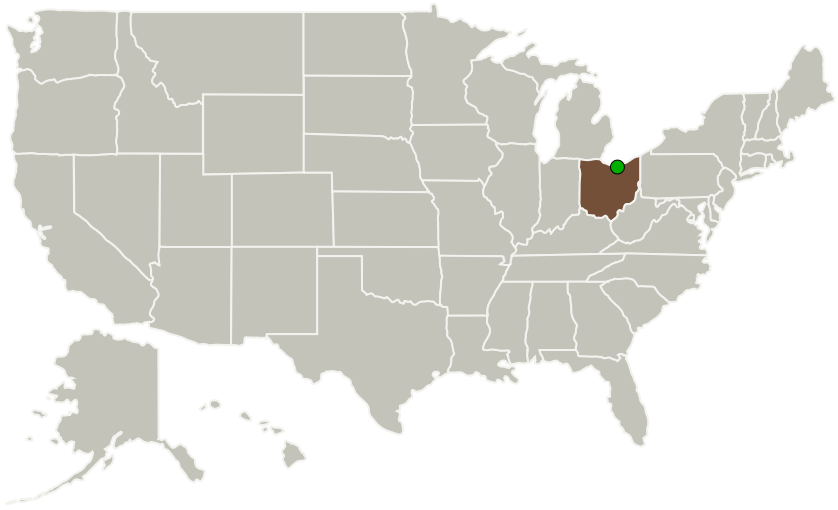
Methane-Oxygen Solid Oxide Fuel Cell System, Phase I

Completed Technology Project (2016 - 2016)

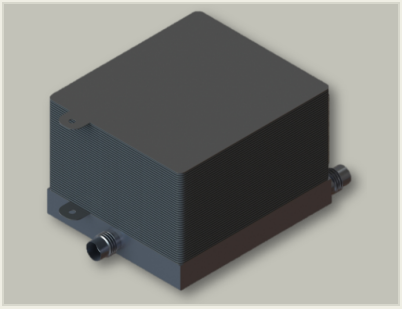
Project Introduction

NASA has a defined need for energy dense and highly efficient energy storage and power delivery systems for future space missions. Compared to other fuel cell technologies, solid oxide fuel cell (SOFC) based systems are better suited to meeting NASA's efficiency targets while operating directly on methane and oxygen reactants. SOFC power systems for lunar landers and other exploration vehicles are an ideal application for this technology, as well as for power generation on the moon or on Mars. Nexceris has established SOFC technology that offers high power density and high single-pass fuel utilization, making it uniquely suited for achieving NASA's performance and efficiency requirements. In this project, NexTech will establish a process model for an externally reformed SOFC system that operates with oxygen and methane reactants, design a reformer and a stack for the system, refine the reformer and stack designs via modeling and analysis, validate the design and performance predictions via catalyst and stack testing.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
NexTech Materials, Ltd.	Lead Organization	Industry	Lewis Center, Ohio
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



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Primary U.S. Work Locations
Ohio

Project Transitions

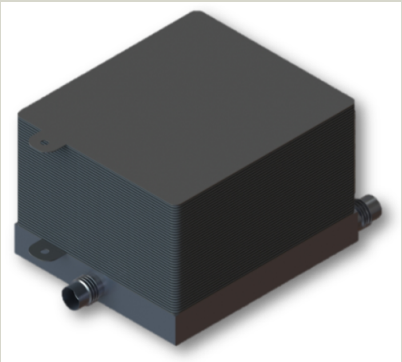
June 2016: Project Start

December 2016: Closed out

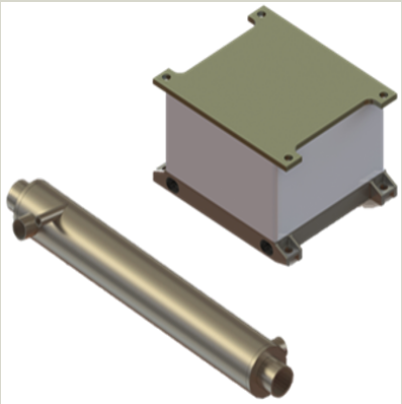
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139750)*

Images



Briefing Chart Image
Methane-Oxygen Solid Oxide Fuel Cell System, Phase I *(https://techport.nasa.gov/image/136967)*



Final Summary Chart Image
Methane-Oxygen Solid Oxide Fuel Cell System, Phase I Project Image *(https://techport.nasa.gov/image/126799)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
NexTech Materials, Ltd.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

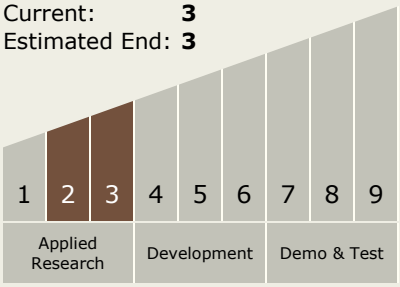
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Scott L Swartz

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System